DUST FORMATION AND LOCATION IN DIVERTOR WITH RADIATIVE SEMI-TRANSPORENT LINER.

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A concept of divertor with radiative semi-transporent liner (or «hot liner» concept) is estimated now as rather attractive. Preliminary experimental and theoretical study show that the increasing of liner surface temperature up to 800-1200°C results in effective transformations of incoming atomic tritium and carbon into stable hydrocarbons, which can be pumped safely to the reprocessing plant. So, it is expected that «hot liner» does not accumulate carbon, mitigating problem of dust and flake formation. However, at least two factors remain to be assessed properly. Firstly, the intensity of beryllium film growth on the hot liner surfaces in steady-state phase (normal operation mode) has not yet has been analysed. Studying of the possibility of such films formation is important from the safety point of view because beryllium is chemically active just in the range 800-1200°C. Secondly,
the Be and W dust formation and location in hot liner regime was not studied too.

In this paper the intensity of Be film growth on the divertor surfaces in steady-state phase of ITER is studied. Dust and flakes formation during off-normal events and their possible locations in the divertor are analyzed too.

It is shown that a process of Be film formation on the surface of liner plates takes place at temperature below 1050°C. Irradiation of this film during long pulse disruptions or ELMs leads to intensive Be dust formation which locates at the bottom of divertor volume.

Carbon films can be deposited at certain temperature level onto the liner during a thermal quench and should be converted into hydrocarbons, by atomic hydrogen etching during the next normal operating pulses.

W dust formation and carbon collection beneath the liner plates depends mainly on the power load of the Vertical Target during off-normal events. It is shown that intensity of these processes is minimal during short pulse disruptions.